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EXAMINER

BROCK II, PAUL E

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 13

Application Number: 09/898,321
Filing Date: July 02, 2001
Appellant(s): STREET ET AL.

Patrick T. Bever
For Appellant

MAILED
JAN 05 2004
GROUP 2800

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 3, 2003.

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(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1 – 10, 21, and 24 – 30 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,587,591	Kingsley et al.	12-1996
6,037,248	Ahn	3-2000
5,712,494	Akiyama et al.	1-1998
6,337,284	Hwang et al.	1-2002
5,789,737	Street	8-1998
5,623,161	Fukuda et al.	4-1997
5,262,649	Antonuk et al.	11-1993
2002/0135041	Kunikiyo	9-2002
5,604,658	Pedder	2-1997

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley et al. (USPAT 5587591) in view of Ahn (USPAT 6037248).

With regard to claim 1, Kingsley discloses in figures 1b – 2b an integrated circuit. Kingsley discloses in figures 1b – 2b a plurality of pixel circuits (134) arranged in rows and columns. Kingsley discloses in figures 1b – 2b a plurality of first lines (132), each first line

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connected to a corresponding column of pixel circuits. Kingsley discloses in figures 1b – 2b a plurality of second lines (131), each second line connected to a corresponding row of pixel circuits. Kingsley discloses in figure 2b wherein the plurality of first lines are formed such that each first line extends over the plurality of second lines at corresponding crossover locations. Kingsley discloses in figure 2a where an insulator is defined at each crossover location that separates each first line from the plurality of second lines. Kingsley does not disclose that the insulator is an air-gap. Ahn teaches in figure 10 wherein an air-gap (56) is defined at each crossover location that separates a first line (70) from a plurality of second lines (36), wherein each air gap extends from a top surface of a corresponding second line to a bottom surface of the each first line. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Kingsley in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26.

With regard to claim 2, Kingsley discloses in figures 1b – 2b wherein each pixel circuit includes an access transistor (134) and a pixel element (120), wherein the access transistor includes a gate terminal connected (136) to an associated first line, a first terminal (137) connected to the pixel element, and a second terminal (138) connected to an associated second line.

With regard to claim 3, Kingsley discloses in figures 1b – 2b, column 4, lines 57 – 67 and column 5, lines 1 – 3 wherein the access transistor comprises amorphous silicon.

With regard to claim 6, Kingsley discloses in column 1, lines 9 – 16 wherein the integrated circuit comprises a medical image sensor array.

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Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Ahn as applied to claims 1 and 2 above, and further in view of Akiyama et al. (USPAT 5712494, Akiyama).

With regard to claim 4, it is not clear if Kingsley and Ahn disclose wherein the access transistor of each pixel circuit comprises a self-aligned thin-film transistor. Akiyama teaches in figures 1a – 1d wherein an access transistor of an each pixel circuit comprises a self-aligned thin-film transistor. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the self-aligned thin-film transistor of Akiyama in the device of Kingsley and Ahn in order to use a thin film field effect transistor which can be operated at high speed even if a channel length is shortened.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Ahn as applied to claims 1 and 2 above, and further in view of Hwang et al. (USPAT 6337284, Hwang).

With regard to claim 5, Kingsley and Ahn do not teach wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated second line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. Hwang teaches in figures 1 – 2d and column 2, lines 15 – 24 wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated second line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the bisbenzocyclobutene of Hwang in the device of

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Kingsley and Ahn in order to take advantage of the high dielectric constant, high moisture resistance and high resistance to electrical breakdown of bisbenzocyclobutene.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Ahn as applied to claims 1 and 2 above, and further in view of Street (USPAT 5789737).

With regard to claim 7, Kingsley discloses in column 3, lines 62 – 67 wherein each pixel element comprises an amorphous silicon sensor. Kingsley and Ahn do not teach wherein each pixel circuit further comprises a phosphor converter located over the amorphous silicon sensor. Street teaches in column 1, lines 11 – 27 wherein each pixel element comprises an amorphous silicon sensor, and wherein each pixel circuit further comprises a phosphor converter located over the amorphous silicon sensor. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the phosphor converter of Street in the device of Kingsley and Ahn in order to convert incoming x-rays to light rays.

Claims 8 and 27 – 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (USPAT 5623161, Fukuda) in view of Ahn.

With regard to claim 8, Fukuda discloses in figures 1 and 2 an image sensor array. Fukuda discloses in figures 1 and 2 and column 4, lines 57 – 67 a plurality of pixel circuits arranged in rows and columns, each pixel circuit including an access transistor (1). Fukuda discloses in figures 1 and 2 a plurality of gate lines (10), each gate line connected (9) to the access transistors of a corresponding column of pixel circuits. Fukuda discloses in figures 1 and 2 a plurality of data lines (12), each data line connected (11) to the access transistors of a

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corresponding row of pixel circuits. Fukuda discloses in figures 1 and 2 wherein the plurality of data lines are formed such that each data line overlaps the plurality of gate lines at corresponding crossover locations. Fukuda discloses in figures 1 and 2 where an insulator (3) is defined at each crossover location that separates each data line from the plurality of gate lines. Fukuda does not disclose that the insulator is an air-gap. Ahn teaches in figure 10 wherein an air-gap (56) is defined at each crossover location that separates a data line (70) from the plurality of gate lines (36), wherein each air gap extends from a top surface of a corresponding gate line to a bottom surface of the each data line. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Fukuda in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26.

With regard to claim 27, Fukuda discloses in figures 1 and 2 wherein the image sensor array further comprises spaced apart data line support pads (portions of insulator 3 to the left and right of gate line 10), and wherein each spaced-apart data line support pad contacts an associated data line.

With regard to claim 28, Fukuda discloses in figures 1 and 2 an image sensor array. Fukuda discloses in figures 1 and 2 a substrate having an upper surface defining a plane. Fukuda discloses in figures 1 and 2 a plurality of pixel circuits arranged in rows and columns over the upper surface of the substrate. Fukuda discloses in figures 1 and 2 a plurality of first lines, each first line being formed on the upper surface of the substrate and connected to a corresponding first group of said pixel circuits. Fukuda discloses in figures 1 and 2 a plurality of second lines connected to a corresponding second group of said pixel circuits. Fukuda discloses in figures 1 and 2 first portions supported by the upper surface of the substrate. Fukuda discloses in figures 1

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and 2 second portions extending over the plurality of first lines at corresponding crossover locations. Fukuda is silent to air gaps. Ahn teaches in figure 10 second portions extending over a plurality of first lines at corresponding crossover locations such that an air gap is defined at each said crossover location between a top surface of a corresponding first line and a bottom surface of the corresponding second portion of said each second line. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Fukuda in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26.

With regard to claim 29, Fukuda discloses in figures 1 and 2 further comprising a plurality of support pads. Fukuda discloses in figures 1 and 2 each support pad being formed on the upper surface of the substrate and contacting a corresponding first portion of an associated second line.

With regard to claim 30, Fukuda discloses in figures 1 and 2 an image sensor array. Fukuda discloses in figures 1 and 2 a substrate having an upper surface defining a plane. Fukuda discloses in figures 1 and 2 a plurality of pixel circuits arranged in rows and columns over the upper surface of the substrate. Fukuda discloses in figures 1 and 2 a plurality of first lines, each first line being formed over the upper surface of the substrate and connected to a corresponding first group of said pixel circuits. Fukuda discloses in figures 1 and 2 a plurality of support pads, each support pad being formed over the upper surface of the substrate; and a plurality of second lines connected to a corresponding second group of said pixel circuits. Fukuda discloses in figures 1 and 2 a plurality of first portions, each first portion contacting a corresponding support pad. Fukuda discloses in figures 1 and 2 second portions extending between adjacent first

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portions. Fukuda is silent to air gaps. Ahn teaches in figure 10 second portions extending between adjacent first portions such that each second portion is freely supported by an associated pair of adjacent first portions, wherein each second portion extends over a corresponding first line such that an air gap is defined between the corresponding first line and said each second portion. over a plurality of first lines at corresponding crossover locations such that an air gap is defined at each said crossover location between a top surface of a corresponding first line and a bottom surface of the corresponding second portion of said each second line. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Fukuda in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda and Ahn as applied to claim 8 above, and further in view of Antonuk et al. (USPAT 5262649, Antonuk).

With regard to claim 9, Fukuda discloses in figures 1 and 2 and column 5, lines 59 – 62 wherein the plurality of gate lines are formed from a first metal layer. Fukuda discloses in figures 1 and 2 and column 6, lines 41 – 50 the plurality of data lines are formed from a second metal layer such that the data lines are located above the first metal layer. Fukuda and Ahn do not disclose what materials comprise a sensor. Antonuk teaches in figures 1 and 2 and column 9, lines 51 – 59 wherein each of a plurality of pixel circuits (50) also comprises a sensor including an amorphous silicon layer (30) formed on a metal plate (22), and wherein the metal plate is formed from a third metal layer formed after a first (14) and second (54) metal layers. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the

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sensor and metal plate of Antonuk in the device of Fukuda and Ahn in order to use a sensor that will achieve real-time diagnostic x-ray radiographic images with immediate presentation after the irradiation without the need to wait for film development or laser scanning of a photostimulable phosphor plate as taught by Antonuk in column 6, lines 18 – 22. It should be noted that “a third metal layer formed after the first and second metal layers” is a product by process limitation which bears no patentable weight in a device claim.

Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda and Ahn as applied to claim 8 above, and further in view of Kunikiyo (USPUB 2002/0135041).

With regard to claim 10, Fukuda and Ahn are silent to a strengthening insulator formed on the plurality of data lines at the crossover locations. Kunikiyo teaches in figures 12 and 13 further comprising a strengthening insulator (58) formed on the plurality of data lines at the crossover locations. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the strengthening insulator of Kunikiyo in the device of Fukuda and Ahn in order to insulate the data line from structures formed thereon.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda and Ahn as applied to claim 8 above, and further in view of Akiyama.

With regard to claim 21, it is not clear if Fukuda and Ahn teach wherein the access transistor of each pixel circuit comprises a self-aligned thin-film transistor. Akiyama teaches in figures 1a – 1d wherein an access transistor of an each pixel circuit comprises a self-aligned thin-film transistor. It would have been obvious to one of ordinary skill in the art at the time of the

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present invention to use the self-aligned thin-film transistor of Akiyama in the device of Fukuda and Ahn in order to use a thin film field effect transistor which can be operated at high speed even if a channel length is shortened.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda and Ahn as applied to claim 8 above, and further in view of Hwang.

With regard to claim 24, Fukuda and Ahn do not teach wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated data line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. Hwang teaches in figures 1 – 2d and column 2, lines 15 – 24 wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated data line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the bisbenzocyclobutene of Hwang in the device of Fukuda and Ahn in order to take advantage of the high dielectric constant, high moisture resistance and high resistance to electrical breakdown of bisbenzocyclobutene.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda, Ahn, and Hwang as applied to claims 8 and 24 above, and further in view of Pedder (USPAT 5604658).

With regard to claim 25, Fukuda, Ahn, and Hwang are silent to the buried insulator layer has a thickness of 3 to 5 microns. Pedder teaches in column 2, line 1 wherein a buried insulator layer has a thickness of 5 microns. It would have been obvious to one of ordinary skill in the art

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at the time of the present invention to use the thickness of Pedder in the device of Fukuda, Ahn, and Hwang in order to have a thickness that is well known as an insulating thickness.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda, Ahn, and Hwang as applied to claims 8 and 24 above, and further in view of Kingsley.

With regard to claim 26, Fukuda, Ahn, and Hwang do not teach wherein the charge sensing region of each of the plurality of pixel circuits comprises an amorphous silicon (a-Si:H) layer. Kingsley discloses in column 3, lines 62 – 67 wherein a charge sensing region of each of a plurality of pixel circuits comprises an amorphous silicon (a-Si:H) layer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the amorphous silicon region of Kingsley in the device of Fukuda, Ahn, and Hwang in order to use a sensing means well known in the art.

(11) Response to Argument

A. Claims 1 – 3 and 6 are not patentable under 35 U.S.C 103(a) over Kingsley in view of Ahn

1. The rejection of Claim 1 as unpatentable over Kingsley and Ahn is proper.

With regard to Appellant's argument that the rejection "fails to explain why one of ordinary skill in the art at the time of the invention was made would have been motivated to make the proposed modification," it should be noted that an explanation of why one of ordinary skill in the art at the time the present invention was made would have been motivated to make the proposed modification can be found in appellants "underlined sections" on page 10 of the Appeal Brief. In the last sentence on page 10 of the appeal brief, a portion of the final rejection

is quoted that contains a proper motivation for making the rejection. Appellant has not stated why or how this motivation fails. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

(a) Ahn teaches a motivation for the proposed combination

With regard to Appellant's quotation of Kingsley on page 12 of the Appeal Brief. The figure shown by the Appellant on the bottom left corner of the page is not an accurate description of Kingsley. Kingsley in column 4, line 58 – column 5, lines 22 refers to figure 2a shown on page 2 of 3 (in the figures) of the Kingsley patent. A quick review of figure 2a in Kingsley shows that Appellant's figure on page 12 of the Appeal Brief is not accurate.

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With regard to appellant's argument that "Kingsley neither teaches nor suggests replacing the dielectric material located at crossover regions 140 with the 'air-gap' arrangement," it should be noted that the rejection is based on a combination of Kingsley with Ahn. U.S.C. section 103 does not state that each reference must teach or suggest the combination. Appellant further states that "Kinsley discusses omitting or removing 'semiconductive material' from the crossover regions," it should be noted that this teaching was never cited in the final rejection repeated above. The reason why this teaching was not recited in the rejection is because it has nothing to do with the combination. Appellant attempts to use this teaching to show that the rejection is "out of context." However, since the rejection did not rely on this teaching, the rejection is not

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“out of context.” Since the teaching of “omitting or removing the dielectric material from between the data and scan lines” has only been suggested to have been taught by Ahn, these arguments (see page 13 of the Appeal brief, first paragraph) with respect to Kingsley are not persuasive. Therefore, appellant’s arguments are not persuasive, and the rejection is proper.

With regard to appellant’s argument that “Ahn neither teaches nor suggests that the disclosed air gap structure could be utilized to modify the fluoroscopic radiation imager of Kingsley,” it should be noted that Ahn is used to teach that an air gap structure is a well known dielectric structure to use between metal layers. Ahn’s lack of teaching a fluoroscopic radiation imager does not factor into the rejection. Ahn is only used to teach an alternate dielectric to be used between Kingsley’s metal lines at the crossover location. Therefore, appellant’s arguments are not persuasive, and the rejection is proper.

With regard to appellant’s argument citing “the fabrication method taught by Ahn,” it should be noted that the claims are only concerned with the device. The method of manufacturing the device of Ahn does not factor into the rejection because the claims are only drawn to a device. The device of Ahn uses an air-gap structure, and this feature is used in the rejection in combination with Kingsley. Therefore, appellant’s arguments are not persuasive, and the rejection is proper.

(b) There is a reasonable expectation of success that the combination of Kingsley and Ahn would be successful

With regard to appellant’s argument that “utilizing the teachings of Ahn would require replacing Kingsley’s dielectric layer with photoresist,” it should be noted that appellant’s arguments are all drawn to the manufacturing processes of Ahn and Kingsley. The claims are

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drawn to a device. Ahn would not suggest that the dielectric of Kingsley's transistor between the gate electrode (138) and the semiconductive region (139) would be replaced by an air gap. A further reading of Ahn shows a dielectric layer (33) between a gate electrode (36) and a semiconductive layer 32 to form a transistor device. Since Ahn teaches a dielectric layer of oxide for use in the transistor, one of ordinary skill in the art at the time of the present invention would not be motivated to change the transistor dielectric of Kingsley. While the manufacturing process of Ahn would have to be modified in order to only use an air-gap structure for the crossover locations in Kingsley, the claims are drawn to a device. The rejection is not required to show how the method of manufacture of Kingsley and Ahn would be modified, only that the claimed device would be obvious. The rejection meets all criteria for rejecting the device claim. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With regard to appellant's argument that "the structure taught by Ahn would fail to provide proper support for the photosensor structure utilized in Kingsley," it should be noted that Ahn is not relied on to teach a photosensor. Kingsley provides proper basis for the photosensor. A quick review of figure 2a of Kingsley shows that the photosensor 120 is not directly over the crossover location 140, and an air-gap structure at the crossover location would not be required to support the photosensor. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

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With regard to appellant's argument that "the rejection of Claim 1 fail(s) to properly identify a motivation for combining the Ahn and Kingsley," it should be noted that the motivation to combine Ahn and Kingsley is in the final rejection and the rejection repeated above. Specifically "It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Kingsley in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26." [emphasis added to stress the motivation]. Appellant has not stated any reason why this motivation fails or "does not exist". While appellant has tried to show that "modifying Kingsley to include the air gap structure taught by Ahn would likely produce an inoperable structure," appellant's arguments have relied on the method of manufacture and failed to address all of the structural features of Ahn and Kingsley. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

2. The rejections of Claims 2, 3, and 6 as unpatentable over Kingsley and Ahn are proper

Appellant does not bring forth any new arguments. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

B. Claim 4 is not patentable under 35 U.S.C. 103(a) over Kingsley in view of Ahn and Akiyama

Appellant does not bring forth any new arguments. Akiyama is relied on to teach a self-aligned thin film transistor. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

C. Claim 5 is not patentable under U.S.C 103(a) over Kingsley in view of Ahn and Hwang

Appellant does not bring forth any new arguments. Hwang is relied on to teach a buried insulator region of bisbenzocyclobutene. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

D. Claim 7 is not patentable under U.S.C 103(a) over Kingsley in view of Ahn and Street

Appellant does not bring forth any new arguments. Street is relied on to teach a phosphor converter. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

E. Claims 8 and 27 – 30 are not patentable under U.S.C 103(a) over Fukuda in view of Ahn

1. The rejection of Claim 8 as unpatentable over Fukuda and Ahn is proper

With regard to Appellant's argument that the rejection "fails to explain why one of ordinary skill in the art at the time of the invention was made would have been motivated to make the proposed modification," it should be noted that the explanation of why one of ordinary skill in the art at the time of the present invention was made would have been motivated to make the proposed modification can be found in appellants "underlined sections" on page 19 of the Appeal Brief. In the last sentence on page 19 of the appeal brief, a portion of the final rejection is quoted that contains a proper motivation for making the rejection. Appellant has not stated why or how this motivation fails. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

(a) Ahn teaches a motivation for the proposed combination

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With regard to appellant's argument that "Fukuda neither teaches nor suggests replacing the silicon nitride insulating layer with the 'air-gap' arrangement," it should be noted that the rejection is based on a combination of Fukuda with Ahn. U.S.C. section 103 does not state that each reference must teach or suggest the combination. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

With regard to appellant's argument that "Ahn fails to teach or suggest a motivation for utilizing Ahn's air gap structure to modify the circuit arrangement taught by Fukuda," it should be noted that Ahn teaches a motivation to use an air gap structure where metal lines are in close proximity to each other. While Ahn does not specifically mention "the circuit arrangement taught by Fukuda" 35 U.S.C. 103(a) does not require one reference to mention the other reference by name. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

With regard to appellant's argument citing "the fabrication method taught by Ahn," it should be noted that the claims are only concerned with the device. The method of manufacturing the device of Ahn does not factor into the rejection because the claims are only drawn to a device. The device of Ahn uses an air-gap structure, and this feature is used in the rejection in combination with Fukuda. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

With regard to appellant's argument that "Ahn neither teaches nor suggests that the disclosed column structure could be modified such that it would be suitable to provide air gaps between the gate and source lines of Fukuda," it should be noted that Ahn is used to teach that an air gap structure is a well known dielectric structure to use between metal layers. Ahn's lack of

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teaching a gate and source line does not factor into the rejection. Ahn is only used to teach an alternate dielectric to be used between Fukuda's gate and source lines at the crossover location. The column structure of Ahn is not necessary for the combination. Therefore, appellant's arguments are not persuasive, and the rejection is proper.

(b) There is a reasonable expectation of success that the combination of Fukuda and Ahn would be successful

With regard to appellant's argument that "utilizing the teachings of Ahn would require replacing Fukuda's silicon nitride insulating layer 3 both beneath the intersection of gate line 10 and source line 12, and also in the channel region between gate electrode 9 and amorphous silicon gate structure 15, which would cause silicon gate structure 15 to collapse," it should be noted that appellant's arguments are all drawn to the manufacturing processes of Ahn and Fukuda. The claims are drawn to a device. Ahn would not suggest that the dielectric (3) of Fukuda's transistor between the gate electrode (9) and the semiconductive region (15) would be replaced by the air gap. A further reading of Ahn shows a dielectric layer (33) between a gate electrode (36) and a semiconductive layer (32) to form a transistor device. Since Ahn teaches a dielectric layer of oxide for use in the transistor, one of ordinary skill in the art at the time of the present invention would not be motivated to change the transistor dielectric of Fukuda. While the manufacturing process of Ahn would have to be modified in order to only use an air-gap structure for the crossover locations in Fukuda, the claims are drawn to a device. The rejection is not required to show how the method of manufacture of Fukuda and Ahn would be modified, only that the claimed device would be obvious. The rejection meets all criteria for rejecting the

device claim. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With regard to appellant's argument that "Ahn does not teach supporting amorphous silicon gate structures," it should be noted that Ahn is not relied on to teach a support. Supports are not in the claimed invention of claim 8. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

With regard to appellant's argument that "the rejection of Claim 8 fail(s) to properly identify a motivation for combining the air gap structure of Ahn with the structure of Fukuda," it should be noted that the motivation to combine Ahn and Fukuda is in the final rejection and the rejection repeated above. Specifically "It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Ahn in the device of Fukuda in order to reduce the capacitance between the lines as taught by Ahn in column 3, lines 23 – 26." [emphasis added to stress the motivation]. Appellant has not stated any reason why this motivation fails or "does not exist". While appellant has tried to show that "modifying Fukuda to include the air gap structure taught by Ahn would likely produce an inoperable structure," appellant's arguments have relied on the method of manufacture and failed to address all of the structural features of Ahn and Fukuda. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

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2. The rejections of Claims 28 and 30 as unpatentable over Fukuda and Ahn are proper

Appellant does not bring forth any new arguments. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

2. The rejections of Claims 27 and 29 as unpatentable over Fukuda and Ahn are proper

Appellant does not bring forth any new arguments. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

F. Claim 9 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn and Antonuk

Appellant does not bring forth any new arguments. Antonuk is relied on to teach a sensor and metal plate. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

G. Claim 10 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn and Kunikiyo

Appellant does not bring forth any new arguments. Kunikiyo is relied on to teach a strengthening insulator. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

H. Claim 21 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn and Akiyama

Appellant does not bring forth any new arguments. Akiyama is relied on to teach a self-aligned thin film transistor. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

With regard to reinstatement of claims 22 and 23, it should be noted that these dependent claims are part of a non-elected species. The claims from which claims 22 and 23 depend are not allowable. Therefore, claims 22 and 23 remain withdrawn.

I. Claim 10 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn and Hwang

Appellant does not bring forth any new arguments. Hwang is relied on to teach a buried insulator region of bisbenzocyclobutene. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

J. Claim 10 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn, Hwang, and Pedder

Appellant does not bring forth any new arguments. Hwang is relied on to teach a buried insulator region of bisbenzocyclobutene. Pedder is relied on to teach a thickness of a buried insulator. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

K. Claim 10 is not patentable under U.S.C 103(a) over Fukuda in view of Ahn, Hwang, and Kingsley

Appellant does not bring forth any new arguments. Hwang is relied on to teach a buried insulator region of bisbenzocyclobutene. Kingsley is relied on to teach a amorphous silicon charge-sensing region. Therefore, the appellant's arguments are not persuasive, and the rejection is proper.

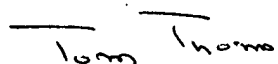

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Appellant has not indicated any reason why the motivation to use an air gap structure of Ahn in metal line crossover locations of Kinsley or Fukuda would fail. While the appellant relies on the method of manufacturing the device of Ahn to shed doubt into the proposed combination, it is again pointed out that the claims are directed to a device, not a method of making. Therefore, appellant's arguments are not persuasive and the rejection is proper.

For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

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